

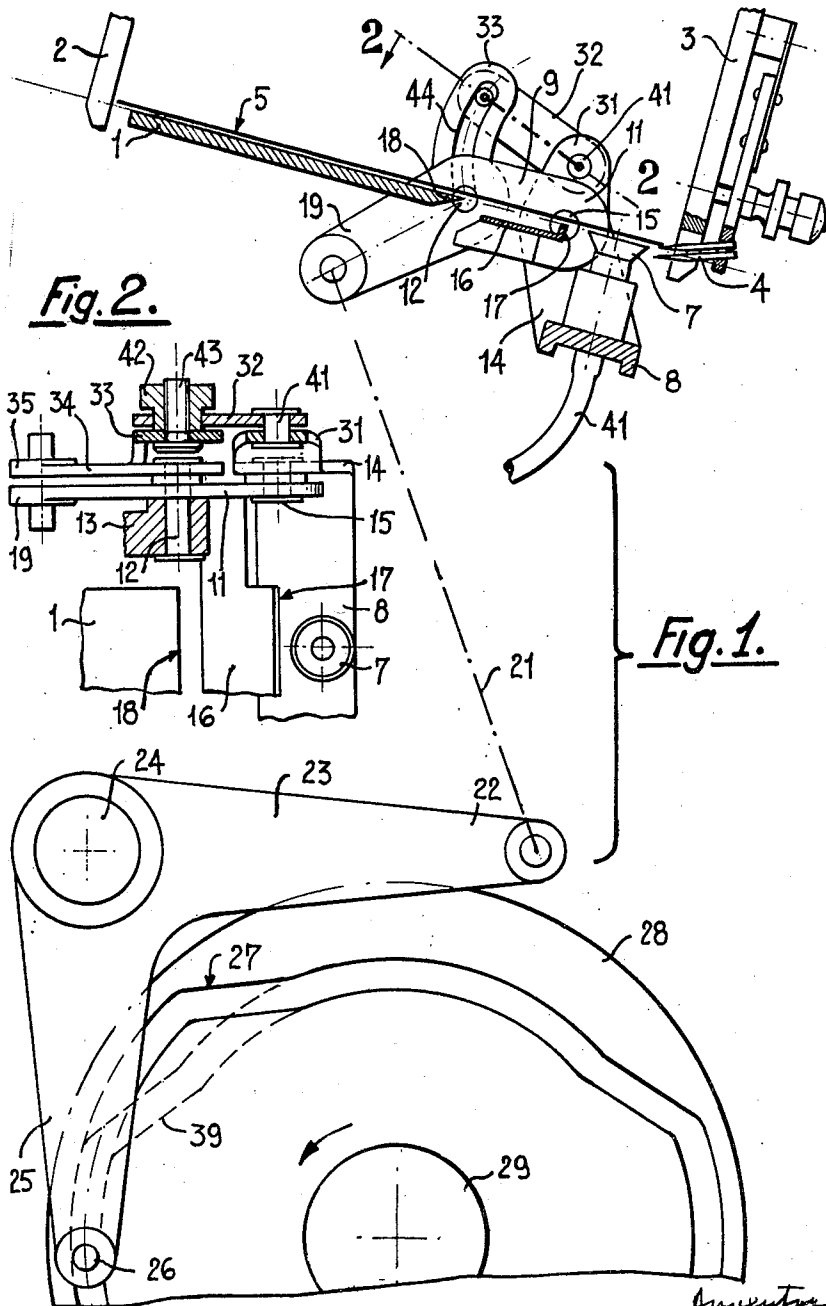
Sept. 25, 1962

M. KISTER  
DEVICES FOR DISTRIBUTING ONE BY ONE  
FOILS PLACED IN A STACK

3,055,658

Filed June 13, 1961

3 Sheets-Sheet 1



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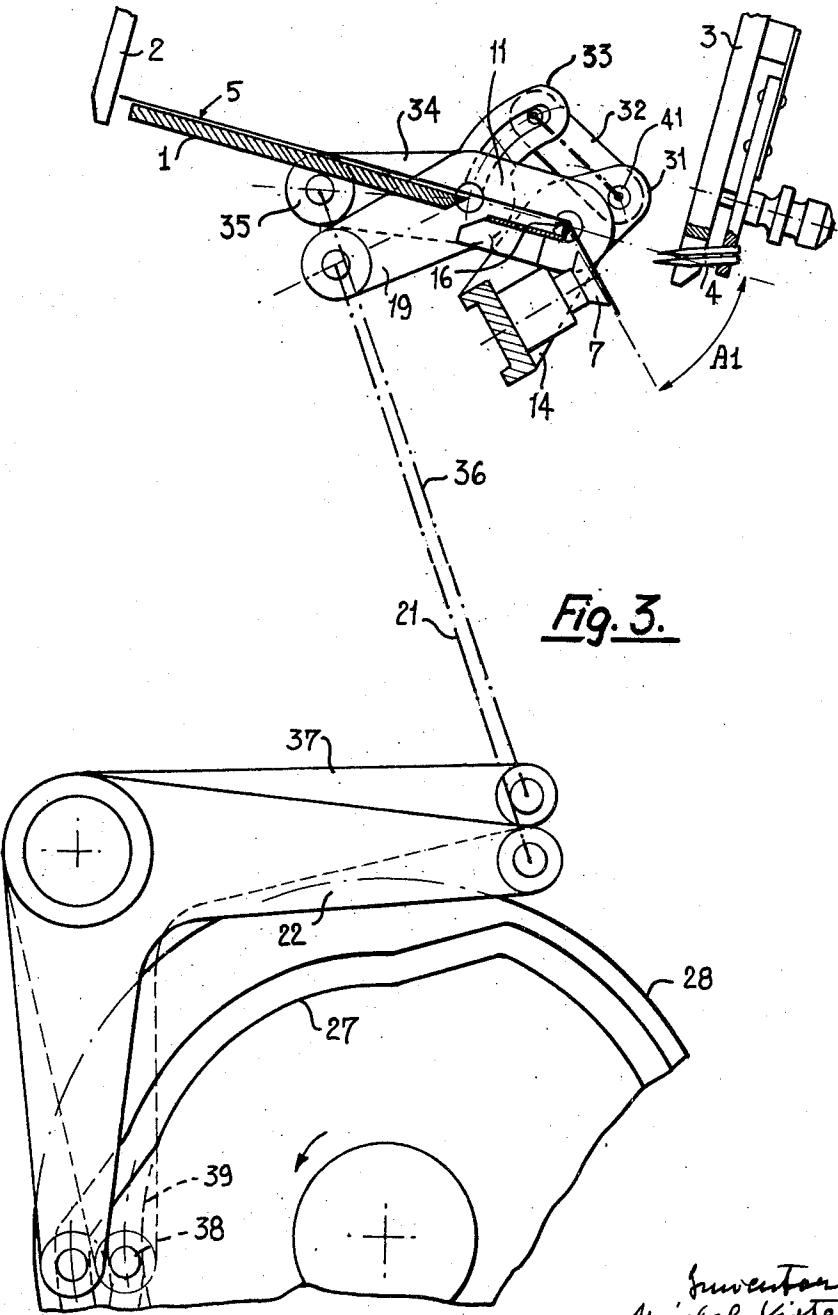
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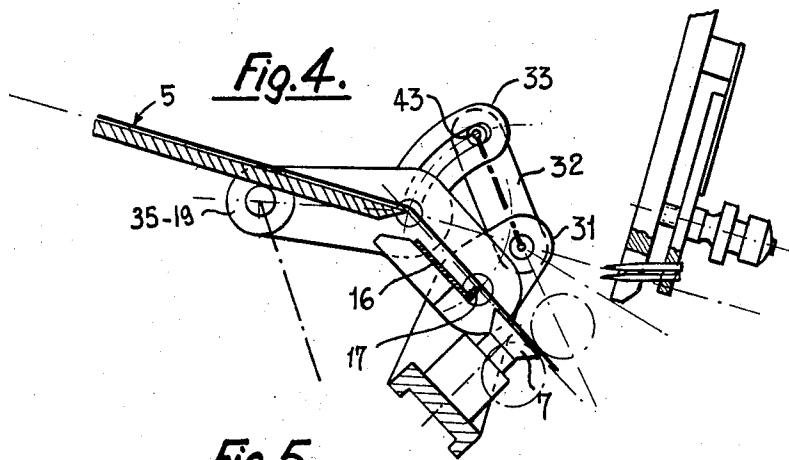
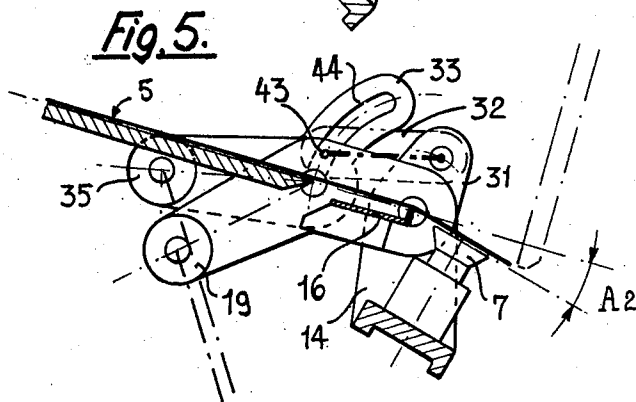
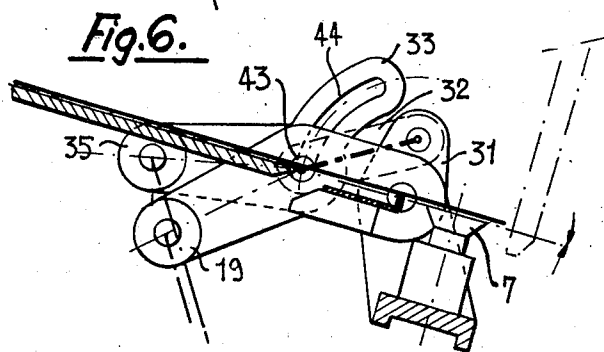
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## DEVICES FOR DISTRIBUTING ONE BY ONE FOILS PLACED IN A STACK

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7 Claims. (Cl. 271-29)

This invention concerns devices for distributing, one by one, foils, disposed in a stack. Known devices for this purpose comprise a magazine for the stack of foils, such magazine having edge stops for retaining the foils and an extracting mechanism comprising a suction member borne by a supporting lever and driving means for imparting reciprocating rotary motion to such lever to cause the suction member to seize an edge part of the first foil of the stack, then to curve such part of the foil because of the circular motion of the lever, to bring such part of the foil within the range of gripping means which pull the foil out of the magazine.

It is an object of this invention to provide an improved device for this purpose, which is suitable for regular distribution of flexible foils having reduced bending resistance (such as thin foils, airmail paper) and also of relatively rigid foils (e.g. thick foils, thin cardboards, pamphlets, brochures and so on). To this end, a device according to this invention comprises a support lever including a base part pivoted to a stationary member, and an end part articulated to the base part and bearing a suction member, the support lever also carrying a member for bearing a foil and disposed near the articulation between these two parts; and driving means for first pivoting the end part of the support lever relatively to the base part thereof to curve a foil on to the bearing member in order to release the foil from the magazine stops, and for thereafter rotating the two parts of the lever in opposite directions to retract the bearing member by straightening the lever.

An embodiment of the device according to the invention is illustrated by way of example in the drawings wherein:

FIGURE 1 is a side elevation of the device in the position for a first phase of operation;

FIGURE 2 is a partly sectional plan view taken along the line 2-2 of FIGURE 1;

FIGURE 3 shows the device in a later operating phase from that shown in FIGURE 1; and

FIGURES 4, 5 and 6 correspond with a portion of FIGURE 3 but show different settings of the parts.

The device illustrated in the drawings comprises a magazine for a stack of foils; the magazine comprises a baseplate 1, on which the stack of foils rests, and side guides, as shown at 2, 3 which engage around the stack. The base plate 1 extends only over a part of the base of the magazine, and the guides 3 which are separate from the baseplate 1 have edge stops formed by needles 4 adapted to retain the front edge of the bottom foil of the stack 5. The device comprises an extracting mechanism for seizing that part of the bottom foil which is disposed between the plate 1 and the guide 3, and to bend such part of the foil to bring it within the range of gripping means (not shown) for removing the foil from the magazine. The extracting mechanism comprises sucker discs, as shown at 7, which are disposed on a crossbar 8 borne by two identical support levers, as shown at 9, disposed at the two ends of the crossbar 8. The lever 9 comprises a basepart 11 pivoted to a spindle 12 borne by a stationary part 13 of the frame of the device, and an end part 14 pivoted to the base part 11 by a spindle 15. The crossbar 8 on which the sucker discs 7 are disposed is borne by the end part 14. The lever basepart 11 also bears a cross-

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piece 16 which has a ridge 17 parallel with the front edge 18 of the baseplate. The ridge 17 is aligned with the pivot spindle 15 of the lever end part 14. The lever basepart 11 has a rearward arm 19 connected by a rod 21 to an arm 22 of a bent lever 23 pivoted at 24. The other arm 25 of the bent lever 23 comprises a pin 26 bearing against a cam formed by a groove 27 in the front surface of a disc 28 rotating around a spindle 29. The lever end part 14 comprises a top arm 31 connected by a rod 32 to one arm 33 of a bellcrank lever 34 pivoting around the same spindle 12 as the lever basepart 11.

The bellcrank lever 34 has a rearward arm 35 (see FIGURES 2 and 3) which has the same contour as the arm 19 and is disposed immediately therebehind as seen in FIGURE 1. The arm 35 is connected by a rod 36 (FIGURE 3) to one arm of a bent lever 37 identical with the bent lever 23 and placed parallel therewith. The lever 37 has a pin 38 (see FIGURE 3) bearing against a cam formed by a groove 39 in the rear surface of the disc 28.

When the foil is picked up, the various elements of the device are in the position shown in FIGURE 1, in which the ridge 17 is in the plane of the baseplate 1 and the sucker discs 7 bear against the bottom foil of the stack 5, to pick up such foil when a negative pressure is produced in a channel inside the discs 7, such channel being connected to an exhausting pump by a flexible pipe 41. In a first phase of operation the bellcrank lever 34 is moved into an angular position shown in FIGURE 3, while the lever basepart 11 remains stationary. Such movement of the lever 34 rotates the lever end part clockwise through the agency of the rod 32. The sucker discs 7 are therefore moved into the position shown in FIGURE 3, with the result that the foil is bent over the ridge 17 and the front edge of the foil 5 is disengaged from the needles 4.

In a second phase of operation the lever basepart 11 is pivoted through an angle equal to the angle previously described by the bellcrank lever 34, but the same remains stationary. The new position of the device is shown in FIGURE 4. This movement of the lever basepart 11, which rotates clockwise, simultaneously rotates the lever end part 14 anti-clockwise, so that the support lever is straightened and the bearing ridge 17 disappears. The relative position of the lever 34 and the lever basepart 11 is then as at the beginning of operations (FIGURE 1) so that the sucker discs 7, ridge 17 and front edge 18 of the plate 1 are in alignment again. In this position, which is shown in FIGURE 4, the front part of the foil is moved within the range of gripper means (shown in broken line) which remove the foil from the magazine. When the foil has been removed from the magazine, the lever basepart 11 and the bellcrank lever 34 are returned simultaneously to their initial position, so that the device returns to the position shown in FIGURE 1. The sucker discs 7 then seize the next foil of the stack to remove the same from the magazine during a further cycle of operations.

As can be seen in FIGURE 2, the rod 32 is pivoted at one of its ends 41 to the top arm 31 of the element 14. The other end of the rod 32 is pivoted on a pulley 42 screwed to a screw 43 received in a curved slot 44 contrived in the arm 33 of the bellcrank lever 34 (FIGURES 1 and 2). The slot 44 extends along a circle arc which has at its centre the axis of the spindle 41, the rod 32 being pivoted to the spindle 41 for movement along such circle arc and being pivoted to the arm 31 of the lever end part 14 so that the connecting member formed by the pulley 42 and screw 43 can be moved along the guide formed by the slot 44 without any change in the angular position of the lever end part 14. The screw 43 has a bottom square part to prevent the screw 43 from rotat-

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ing in the slot 44, and the clamping of the pulley 42 enables the screw 43 to be locked in the selected position of adjustment.

At the setting shown in FIGURE 1, the place of connection of the rod 32 is at the top end of the slot 44, so that the eccentricity of such place of connection relatively to the rotational centre 12 of the bellcrank lever 34 is at its maximum. When the lever 34 rotates, the lever part 14 is therefore rotated at a maximum angle A1 as shown in FIGURE 3. If, however, the screw 43 is placed in an intermediate position in the slot 44 as shown in FIGURE 5, the lever part 14 rotates through a smaller angle A2. The screw 43 can also be placed in an end position of zero eccentricity, as shown in FIGURE 6, in which position movements of the bellcrank lever 34 does not rotate the lever end part 14 at all.

Movement of the connection place formed by the screw 43 does not change the orientation of the sucker discs 7 in the initial position of the mechanism; also, the final position of the sucker discs in unaltered—i.e. it is the position shown in FIGURE 3—whatever position is given the screw 43.

The disengagement of the edge of the foil to pass under the needles 4 is effected because of the preliminary cambering of the foil on the ridge 17. When very flexible foils, such as sheets of airmail paper, are being distributed, the screw 43 is placed at its top setting (FIGURES 1 and 3) so that the foil edge disengages readily from the needles because of the considerable curvature of the foil.

To distribute thicker foils, the screw 43 is placed in an intermediate position (FIGURE 5) so that the angle of curvature is reduced and is selected in dependence upon the resilience of the foils to be distributed. To distribute fairly rigid foils, for instance, thin cardboard foils, the curvature of the ridge can, in extreme cases, be reduced to zero (FIGURE 6).

The amplitude of the preliminary cambering angle A can therefore be varied to suit the flexibility of the foil to be removed, the final extraction position of the foil remaining the same whatever the value of the previous cambering angle. The device illustrated can therefore be used to distribute foils of widely differing qualities.

I claim:

1. A device for distributing one by one foils placed in a stack, comprising: a magazine for a stack of foils, such magazine having edge stops for retaining the foils; an ex-

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tracting mechanism comprising a supporting lever and a suction member carried thereby; gripping means for pulling the foil out of the magazine; driving means for imparting reciprocating rotary motion to the supporting lever to cause the suction member to seize an edge part of the first foil of the stack and then to curve such part of the foil to bring such part of the foil within the range of said gripping means; said support lever including a stationary member, a base part pivoted thereto, and an end part articulated to the base part and carrying said suction member, a bearing member disposed on said support lever near the articulation between the base part and the end part thereof, and said driving means acting first to pivot the end part of the support lever relatively to the base part thereof to curve the foil on to said bearing member in order to release the foil from the magazine stops, and thereafter to rotate the end part and the base part of the support lever in opposite directions to retract the bearing member by straightening the lever.

2. The device of claim 1, in which said driving means include a bellcrank member which is given a constant-amplitude rotary reciprocating movement, a connecting member and a rod having one end articulated to the end part of the support lever, and its other end articulated to said connecting member, the latter being rigidly secured to the bellcrank member with adjusted eccentricity relatively to the bellcrank member.

3. The device of claim 2, including a guide on the bellcrank member for receiving said connecting member, the connecting member being adjustable along such guide.

4. The device of claim 3, in which said guide is disposed along a circular arc having as centre the axis of articulation of said rod to the end part of the support lever.

5. The device of claim 4, in which said guide provides for adjustment of the connecting member to a position of zero eccentricity relatively to the rotation axis of the bellcrank member.

6. The device of claim 5, in which the bellcrank member and the support lever base part are rotatably mounted upon a single spindle.

7. The device of claim 6, in which the magazine comprises a stationary member for supporting a stack of foils, this member being disposed near the said common spindle of the bellcrank member and of support lever base part.

No references cited.